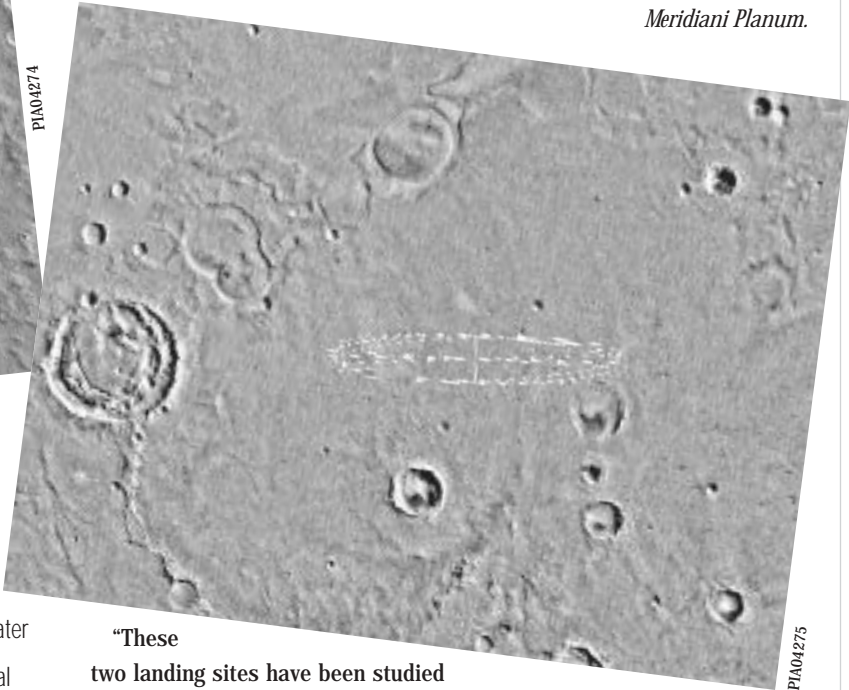
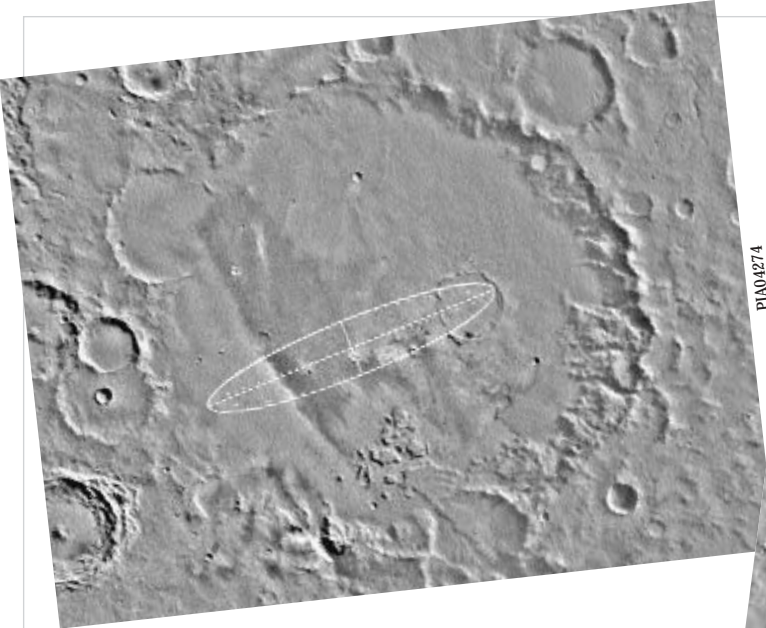


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Mars landing sites chosen

First rover scheduled for June 6 launch

By Guy Webster



Mars Exploration Rovers' designated landing sites are shown in geological context from Viking images, with their landing ellipses. At left is Gusev Crater, the site for the first rover; at right is Meridiani Planum.

NASA HAS CHOSEN

two scientifically compelling landing sites for twin robotic rovers to explore on the surface of Mars early next year. The two sites are a giant crater that appears to have once held a lake, and a broad outcropping of a mineral that usually forms in the presence of liquid water.

Each Mars Exploration Rover will examine its landing site for geological evidence of past liquid water activity and past environmental conditions hospitable to life. "Landing on Mars is very difficult, and it's harder on some parts of the planet than others," said Dr. Ed Weiler, NASA associate administrator for space science. "In choosing where to go, we need to balance science value with engineering safety considerations at the landing sites. The sites we have chosen provide such balance."

The first rover, scheduled for launch no earlier than June 6, will be targeted to land at Gusev Crater, 15 degrees south of Mars' equator. The second, scheduled to launch June 25, will be targeted to land at Meridiani Planum, an area with deposits of an iron oxide mineral (gray hematite) about two degrees south of the equator and halfway around the planet from Gusev.

Which rover is targeted to a specific site is still considered tentative, while further analyses and simulations are conducted. NASA can change the order as late as approximately one month after the launch of the first rover. The first mission will parachute to an airbag-cushioned landing on Jan. 4, 2004, and the second on Jan. 25, 2004.

"A tremendous amount of effort has gone into evaluating possible landing sites in the past two years, to maximize the probability of mission success," said Peter Theisinger, Mars Exploration Rover project manager at JPL.

Images and measurements from Mars Global Surveyor and Mars Odyssey provided scientists and engineers evaluating potential landing sites with details of candidate site topography, composition, rockiness and geological context.

"Meridiani and Gusev both show powerful evidence of past liquid water, but in very different ways," said Dr. Steve Squyres, principal investigator for the rovers' science toolkit and a geologist at Cornell University, Ithaca, N.Y. "Meridiani has a chemical signature of past water. Gray hematite is usually, but not always, produced in an environment where there is liquid water. At Gusev, you've got a big hole in the ground with a dry riverbed going right into it. There had to have been a lake in Gusev Crater at some point. They are fabulous sites, and they complement each other because they're so different."

Mars Exploration Rover site selection began with identifying all areas on Mars that fit a set of engineering-driven requirements, said JPL's Dr. Matt Golombek, co-chair of a landing-site steering committee. To qualify, candidate sites had to be near the equator, low in elevation, not too steep, not too rocky and not too dusty, among other criteria; 155 potential sites were studied. A series of public meetings evaluated the merits of potential landing sites. More than 100 Mars scientists participated in the meetings.

"These two landing sites have been studied more than anywhere else on Mars," said Dr. Cathy Weitz, Mars Exploration Rover program scientist at NASA Headquarters. "Both sites have specific scientific hypotheses that can be tested using the instruments on board each rover. It should be a very busy and exciting time after landing for the scientists analyzing the wealth of new data from the ground."

The beginning of the launch period for the first of the two rovers was rescheduled until no earlier than June 6 to allow time to address an issue raised during pre-launch tests of the spacecraft.

The concern regards cabling that connects the spacecraft's main computer, which is inside the rover, to peripherals in the cruise stage, lander and small deep-space transponder. The connection to the cruise stage is severed during approach to Mars and the connection to the lander is severed before the rover drives off. Pre-launch testing revealed a potential problem in how the spacecraft interprets signals sent when the cables are severed.

Kennedy Space Center said the issue will require fixing on both rovers, but the work is not expected to effect the launch period for the second rover mission, which is scheduled to open June 25 and close July 15.

The second mission cannot launch until 10 days after the first one.

Once they reach their landing sites, each rover's prime mission will last at least 90 martian days (92 Earth days). The rovers are solar-powered, and in approximately 90 days, dust accumulating on the solar arrays likely will

be diminishing the power supply.



Technician Don Benson adjusts a Mars Exploration Rover model during tests on the mesa last week. The model was spun on a long mast (right) to simulate reception of radio frequency waves sent from the antenna to the rover. The cones in the foreground prevent the signals from bouncing on the ground, which would cause disruption.



Photos by Bob Brown / JPL Photolab

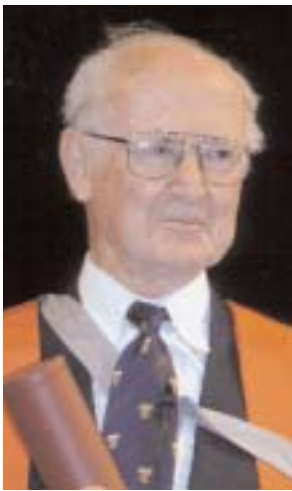
SIRTF launch delayed to August

NASA managers have decided to postpone the launch of the JPL-managed Space Infrared Telescope Facility (SIRTF) aboard a Boeing Delta II rocket until no earlier than mid-August 2003.

The delay will allow engineers enough time to change out one of the nine solid rocket motors attached to the Delta II rocket, which had multiple delaminations within the layers of material that comprise the engine-nozzle exit-cone liner.

"There simply is not enough time to remove and replace the rocket motor to support a SIRTF launch in advance of the Mars Exploration Rover-B launch window," said Karen Poniatowski, assistant associate administrator for launch services at NASA Headquarters.

News Briefs



Dr. William Pickering at New Zealand ceremonies in March.

Pickering garners New Zealand honor
Former JPL Director DR. WILLIAM PICKERING returned to his New Zealand homeland last month to unveil a memorial that honors him and Ernest Rutherford, who earned the Nobel Prize in chemistry in 1908. The memorial is located in the town of Havelock, where both men attended primary school.

Pickering, 92, led the Lab from 1954–76. He has been the longest-serving director in JPL’s history. As part of the ceremonies, he received an honorary doctorate of engineering from University of Canterbury in Christchurch.

At the March 15 ceremony, Pickering was honored by the New Zealand native Maori as well as the by the Rutherford/Pickering committee organized by DR. JOHN CAMPBELL, a University of Canterbury professor. The Maori bestowed to Pickering the name “Te tohunga takirangi ki nga ruanuku,” which translates as “The expert at sending rockets to the planets.”

Lab aids study of coastal eddies

Scientists from JPL and the Naval Research Laboratory took a closer look at the swirling water phenomenon known as coastal eddies when they flew a specially-instrumented NASA airborne sciences DC-8 jet off the Southern California coast this month.

Researchers used the JPL-designed and built Airborne Synthetic Aperture Radar, or AirSar, instrument to study an area known as the Southern California Bight, between Point Conception and San Diego. During daily flights, AirSar captured eddy image sequences in rapid succession, enabling researchers to measure motions caused by the currents.

Coastal eddies can be an important source of transporting nutrients from deep to surface waters, where they stimulate ocean plant growth. They can also transport pollutants from land and recirculate them for days, with both positive and negative consequences for marine life.

Long may it wave

In case you haven’t noticed, there is a new flagpole on top of Building 180. It is 50 feet tall and flies a flag that is 12 by 18 feet. It was installed a few weeks ago to replace the large flag that used to fly periodically from Building 180.

Because the Lab sits in the arroyo, the particular flag and pole were selected because they can withstand 100 mph winds (with gusts up to 130 mph). As a safety precaution, though, the flag will be taken down whenever the winds are projected to be in excess of 40 mph.

ISO auditors on Lab April 29-May 1

Two auditors from JPL’s external registrar company, National Quality Assurance USA, will return to the Lab April 29 to May 1 for a surveillance audit of the revised ISO standard, 9001-2000.

This audit will look at management responsibility, internal assessment, corrective and preventative action, continual improvement and customer satisfaction. It will focus on program and project office planning and flight project subcontracts.

Employees who will be interviewed have been notified and include project and program managers, mission assurance managers, project system engineers, subcontract managers and contract technical managers. If you have questions, contact your ISO organization representative, listed online at <http://iso.jpl.nasa.gov/help/list-orgreps.html>.

- Following is the audit schedule:
- April 29: opening meeting, 8:30 a.m.; debriefing, 4 p.m.; both in 167 conference room
 - April 30: debriefing, 4 p.m.; 167 conference room
 - May 1: closing meeting, 10 a.m., Building 238-543.

For more information, see the ISO website at <http://iso.jpl.nasa.gov>.

Weight Watchers offers options

JPL and contractor employees will soon be offered two options in the Weight Watchers program, as a new 17-week Weight Watchers at Work Series will begin and a new online program will debut.

The first meeting of the new Weight Watchers at Work series will be held on Tuesday, May 6. The cost for the series is \$186.15 (based on a \$10.95 charge for each meeting) paid by check, cash, Visa, MasterCard, Discover or American Express. A three-check payment plan is available for those who sign up either the first or second week. Three checks payable to Weight Watchers for \$62.05 each are collected (all must be dated May 6) at the first meeting and are deposited on May 6, June 6 and July 7.

JPL staff are welcome to join the series at any time. Those who join after the second week are required to pay \$11 for each remaining meeting at the time they enroll.

All meetings are held Tuesdays from 11:30 a.m. to 12:30 p.m. Locations may vary; attendees will be updated via e-mail and the Daily Planet (<http://dailyplanet>). This series runs weekly through Aug. 26.

A minimum of 20 paid members is required for this on-Lab program.

Also available in May, JPL staff can for the first time receive the Weight Watchers Winning Points plan online. The program is designed for those who are unable to attend meetings, and features tools built for efficiency, where employees can track their own progress online as well as keep a running record of foods eaten and weight loss achieved. The normal three-month subscription fee for Weight Watchers Online is \$59.95. However, for a limited time, JPL employees can enjoy a \$10 savings. Visit JPL’s special customized gateway site at www.weightwatchers.com/cs/jpl to learn more and to sign up.

Additional information can be found on the JPL Weight Watchers website at <http://eis.jpl.nasa.gov/hr/esr/wellness/wwatchers.htm> or call LAURIE LINCOLN at ext. 4-1612.

Blood drive in May

The next JPL/Red Cross blood drive will be held in von Kármán Auditorium on Tuesday, May 13, from 10 a.m. to 4 p.m. and Wednesday, May 14, from 7 a.m. to 1 p.m. The Red Cross will give a free T-shirt to all who participate.

Signup sheets are available at Occupational Health Services (Building 310-202), and on their website at http://eis/medical/blood_form.html prior to the blood drive.

To change your appointment, call the Pasadena Red Cross at (626) 960-6956, ext. 225. Last-minute signups may go directly to von Kármán at their preferred time. Be prepared to wait a little longer without an appointment.

The Red Cross continues to experience a critical shortage of all types of blood. Occupational Health Services said the Red Cross collected 157 pints of blood during the two-day drive in February, adding that 471 lives will benefit from that collection.

For more information on blood donations, log on to <http://www.redcross.org/services/biomed/blood/supply/tse.html>.

Right-field bleachers for Lab, campus

The second annual Caltech/JPL Day at Dodger Stadium will be held Saturday, June 21, as the Dodgers host the world champion Anaheim Angels. Tickets are \$8 per person and are available at the JPL Store and the credit union on Lab.

A carnival starting 11 a.m. will include wall climbing, slides, clowns, and face painting. Game time is 1:10 p.m., and the entire right field pavilion will be reserved for JPL and Caltech ticket holders.

The first 2,300 tickets sold will include a voucher for a free Dodger cap, compliments of the Caltech Employees Federal Credit Union.

Tickets are also available at the credit union office in La Cañada.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parents Group for Children With Special Needs—Meets the second Thursday of the month at noon in the Wellness Place, Building 167-111.

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, April 25

Caltech Women’s Club—A Welcoming Coffee will be offered from 4:30 to 6 p.m. at the Caltech Athenaeum’s Ratheskeller. For more information, call Carol Anderson at (818) 790-8175.

Rick Miller in *MacHomer*: “The Simpsons” do *MacBeth*—This one-man show features more than 50 voices from the TV show and will be held at 8 p.m. in Caltech’s Beckman Auditorium. Tickets are \$15 for adults; \$10 for youth. For more information, call (626) 395-4652.

Sunday, April 27

Chamber Music—Winners from the Coleman Chamber Ensemble Competition will perform at 3:30 p.m. in Caltech’s Ramo Auditorium. Tickets are \$10. For more information, call (626) 395-4652.

“The Art of the Infinite: The Pleasures of Mathematics”—Robert and Ellen Kaplan will speak at this Skeptics Society-sponsored lecture at 2 p.m. in Caltech’s Baxter Lecture Hall. Free admission for Caltech/JPL community. For more information, call (626) 395-4652.

Wednesday, April 30

Poetry Reading—Renowned Chinese American poet Marilyn Chin will give a reading and lead an open discussion titled “Writing in a Multicultural World” at 8 p.m. in Caltech’s Ramo Auditorium. Free admission. For more information, call (626) 395-4652.

Volunteer Professionals for Medical Advancement—Meeting at 10:30 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, May 1

Big Band Theory—The JPL swing band rehearses from noon to 1 p.m. in Building 82-115.

Living Trust Seminar—The Caltech Credit Union hosts this free event at 3 and 7 p.m. at the Glendale Hilton. Seating is limited. For reservations, call Shirley at (818) 241-6363.

Fri.–Sat., May 2–3

The Capitol Steps—This a troupe of congressional staffers-turned-comedians who travel the United States satirizing the very people and places that once employed them, and will appear at 8 p.m. in Caltech’s Beckman Auditorium. Tickets are \$32, \$28 and \$24 for adults, youth high school age and under, \$10. For more information, call (626) 395-4652.

Sunday, May 4

Chamber Music—The Academy of St. Martin in the Fields will perform works by Tchaikovsky, Shostakovich, and Mendelssohn. Tickets are \$29, \$25, \$21 and \$17. For more information, call (626) 395-4652.

Tuesday, May 6

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-271.

Tues.–Wed., May 6–7

Investment Advice—TIAA/CREF representatives will be available for one-on-one counseling. For an appointment, visit www.tiaa-cref.com or call (877) 209-3140, ext. 2614.

Wednesday, May 7

“All the Faults in the World: The Cutting Edge of Tectonics”—Caltech geology professor Dr. Brian Wernicke will speak at 8 p.m. in Beckman Auditorium. Free admission. For more information, call (626) 395-4652.

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

“Echoes of the Ancient Skies: The Astronomy of Lost Civilizations”—Dr. E.C. Krupp, astronomer and director of the Griffith Observatory, will speak at 4:45 p.m. in von Kármán Auditorium. The lecture is sponsored by the Caltech Management Association.

Thursday, May 8

Big Band Theory—The JPL swing band rehearses from noon to 1 p.m. in Building 82-115.

JPL Gun Club—Meeting at noon in Building 183-328.

Thu.–Fri., May 8–9

Von Kármán Lecture Series—Brian Wilcox, manager of JPL’s Solar System Exploration Mobility Technology Program, will present “Challenges in Mobility and Robotics for In Situ Science” at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College’s Vosloh Forum, 1570 E. Colorado Blvd. Thursday’s lecture will be webcast; visit <http://www.jpl.nasa.gov/events/lectures/may03.html>. For more information, call Public Services at ext. 4-0112.

Saturday, May 10

Caltech Bands—This concert will feature the combined efforts of the Caltech-Occidental Concert Band, the two Caltech Jazz Bands, and the Caltech Chamber Singers, and will also feature the musical talents of Dr. Leslie Deutsch, the chief engineer for JPL’s Interplanetary Networks Directorate. The free show will be held at p.m. in Beckman Auditorium. For more information, call (626) 395-4652.

Folk Music—Sparky and Rhonda Rucker, who specialize in Americana music with an African American perspective, will perform at 8 p.m. in Caltech’s Dabney Lounge. Tickets are \$15 for adults, \$5 for children under 12. For more information, call (626) 395-4652 or check the Folk Music Society website at <http://www.folkmusic.caltech.edu>.

Ongoing

The Social Security representative will no longer offer one-on-one counseling appointments on Lab. Call the Benefits Office at ext. 4-3760 to arrange for a telephone counseling appointment.

Bob Brown / JPL Photolab



U P N E X T



GALAXY QUEST

*Galaxy Evolution Explorer
prepares for April 28 launch*

Who among us hasn't looked into the dark sky on a clear night, wondering how those faraway stars and galaxies came to be? Soon, a new JPL-managed mission will set out to seek some of those answers.

The Galaxy Evolution Explorer (Galex), set to launch April 28 from Cape Canaveral Air Force Station, Fla., will carry into space an orbiting telescope that will observe a million galaxies across 10 billion years of cosmic history to help astronomers determine when the stars and elements we see today had their origins.

Galex's launch window runs from 4:50 to 6:50 a.m. Pacific time. "We launch in the early morning so that the solar arrays receive best illumination at orbit insertion to help the batteries stay charged," said Project Manager Dr. Jim Fanson of JPL.

From its orbit high above Earth, Galex will sweep the skies for up to 28 months using state-of-the-art ultraviolet detectors. Looking in the ultraviolet will single out galaxies dominated by young,

20 months of the mission are dedicated to conducting eight specific surveys—investigations on the local universe and on the history of star formation. During Galex's final eight months, the surveys will be augmented by other observations designed by the mission's associate investigators.

Galex's primary objective is to learn what factors trigger star formation inside galaxies; how quickly stars form, evolve and die; and how heavy chemical elements form in stars. Additional goals include determining how fast stars are forming inside each galaxy, determining when and how the stars we see today formed, creating the first map of the ultraviolet universe, and helping scientists find and understand ultraviolet bright quasars.

Galex will search for galaxies in which young stars are forming by taking advantage of a peculiarity in the kind of energy that stars put out. A mid-sized, middle-aged star like our Sun throws off energy across a large spectrum of wavelengths, from infrared to visible light to ultraviolet. However, ultraviolet makes up less than 5 percent of the energy given off by the Sun.

Very massive stars, on the other hand, throw off an enormous amount of ultraviolet energy; they shine brightly and die early. Since they never get to be middle-aged like our Sun, any galaxy with a lot of these ultraviolet-bright stars must be one in which new stars are vigorously forming.

Galex's telescope will peer out into the universe at ultraviolet wavelengths to look for these stellar nurseries, observing millions of galaxies.

"The ultraviolet is the last wavelength range for which we do not have a comprehensive view of the sky," said Fanson, whose previous experience includes developing some of the optics for the Wide Field Planetary Camera 2 aboard the Hubble Space Telescope. "Galex will conduct the first wide-

area imaging and spectroscopic surveys in the ultraviolet. Several missions have been flown that have ultraviolet capability—including Hubble—but they have relatively narrow fields of view because they are designed to study specific targeted objects at high resolution.

"Galex has a wide field of view designed to harvest very large numbers of objects. We will produce a terabyte-sized database of objects ranging from nearby stars to distant galaxies and quasars. An immense number of scientific questions can be addressed by this data; galaxy evolution is only one example."

The farther we look out into space, the farther back in time we are seeing. The most distant galaxies Galex will see are about 10 billion light-years from Earth. Since the universe is thought to be 13.7 billion years old, the mission will catalog galaxies across 80 percent of the history of the universe.

Galex will enable scientists to reconstruct the history of our Milky Way galaxy by studying similar galaxies. It will help answer questions about how the Milky Way began and how our star, the Sun, formed within it, an event that paved the way for the eventual development of our solar system, Earth and life.

Galex's science analysis products will be archived by John Hopkins University in Baltimore. The Space Telescope Science Institute is developing the archive and will host the science database. Scientists from around the world will be able to access the mission's data from this archive.

Orbital Sciences Corp., Germantown, Md., is responsible for the spacecraft, integration and testing, ground data system and mission operations, and the launch vehicle. Other partners include UC Berkeley; Yonsei University, Seoul, South Korea; and the Space Astronomy Laboratory, Marseille, France. The mission was developed under NASA's Explorers Program, managed by the Goddard Space Flight Center in Maryland.

More information about the mission is available online at <http://www.srl.caltech.edu/galex>.

The Galex launch, scheduled for 4:50 a.m. Pacific time on April 28, will be carried on a live webcast at <http://www.jpl.nasa.gov/webcast/galexlaunch.html>



The Galex team.

hot, short-lived stars that give off a great deal of energy at that wavelength. These galaxies are actively creating stars, and therefore provide a window into the history and causes of star formation in galaxies.

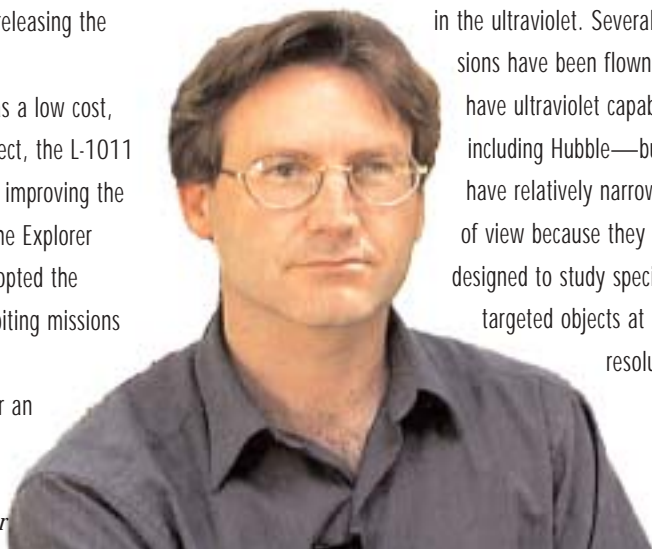
JPL provides project management, mission assurance and other support services. The Lab developed, integrated and tested the science instrument, a 50-centimeter-diameter (19.7-inch) telescope with two ultraviolet detectors (near- and far-ultraviolet). The mission is led by Caltech, which is also responsible for science operations and data analysis.

The satellite—which measures 1 meter (3 feet) wide and 2.5 meters (6.4 feet) high, and weighs in at 277 kilograms (609 pounds)—will be launched by a Pegasus XL rocket released by an L-1011 aircraft. The plane will climb to 11,900 meters (about 39,000 feet) before releasing the launch vehicle and its payload.

The Pegasus launch vehicle was designed as a low cost, flexible launch system, Fanson noted. "In effect, the L-1011 serves as a reusable first stage of the rocket, improving the overall efficiency of the system," he said. "The Explorer Office at Goddard Space Flight Center has adopted the Pegasus as the best match for small Earth-orbiting missions they are particularly interested in."

The science mission will get underway after an initial month of in-orbit checkout. The first

Dr. Jim Fanson, Galex project manager



One NASA idea continues at JPL

This article is the third in a monthly series that describes how NASA centers are realizing the One NASA goal.



JPL's Art Murphy.

Art Murphy, who manages Intercenter Alliance Development at JPL, has been working in the spirit of One NASA for the last few years, forging collaborative alliances that proactively look for new initiatives in space research and development.

Back in 2000, specific technology leadership within NASA was consolidated at various centers, with little overlap. Murphy was managing Space Mission Technology Development at the time. Noting the changes in the agency, he realized it would be very difficult to develop mission-needed technology in this new environment. There were also more pressures on JPL to not do everything itself. In addition, revolutionary technology infusion was being demanded in JPL missions at no greater overall risk or cost. He saw a need to start collaborating with other centers in order to develop the needed complete technology package for JPL missions.

Murphy identified Langley Research Center, Ames Research Center, Glenn Research Center and Marshall Space Flight Center as having the best immediate potential for joint activities with JPL. His idea was to build an interdependent relationship with these centers to use their re-

search and technology development capabilities in JPL's missions. In a January 2001 meeting with the Executive Council, he proposed that if JPL more actively collaborated with these centers, it would enable JPL to do better science. The EC was sold, and Murphy established the four collaborative alliances.

Langley signed the first alliance agreement in February 2002; the other agreements were finalized by the end of that year. "This is a grass roots-up effort to show that centers have the right ideas and attitude," Murphy said. A joint center review is held approximately every six months for each alliance.

"Our relationship with Ames has improved an order of magnitude," Murphy said. "Our relationships are also much better with Langley, Glenn and Marshall. In some ways the only time we saw another center in the past was when we competed for technology work against them. The center directors have been magnificent, very positive about working together."

Currently Ames is funding approximately 80 JPL engineers and scientists on various technical tasks that complement Ames' expertise in the engineering of complex systems, mission autonomy systems, information technology and bio-nanotechnology. Ames will have planning and visualization software technology on both JPL's Mars Exploration Rover ground operations activities. Ames gets to use their

technology on JPL missions and receives strong advocacy for their new technology initiatives. Their technology, in turn, saves JPL the cost of many ground mission engineers.

These alliances are paving the way for future missions such as Jupiter Icy Moons Orbiter by providing technology for them. They will continue to pay off in developing research and development technology for future missions that are about five to 15, or more, years out. "The future is enabled by the present," Murphy reflected. "One center can't be all things to all people like it used to be. We have to be able to depend on other organizations, work with them, nourish them and treat them as we do ourselves. JPL can't maintain the core technology competencies for everything; we need to have strong relations with other centers so we can count on them as team members and work with them to do our missions."

"I believe we owe it to American taxpayers to be as efficient as possible in developing these potentially high-payoff, bold missions by using the best technologies from all NASA centers to generate the most exciting and productive science possible," noted JPL Director Dr. Charles Elachi. "I'm pleased that our alliances contribute to the One NASA initiative, and I'm grateful to Art Murphy and his colleagues at our partner centers for being so persistent and effective in constructing these alliances."

JPL'S ONLINE NEWS SOURCE

Classified ads will be available the day before Universe is published at <http://dailyplanet>

View this and previous issues of Universe at <http://universe.jpl.nasa.gov>
E-mail us at universe@jpl.nasa.gov

Letters

My son and I would like to thank all our friends for their prayers and good thoughts in the recent passing of my beautiful sister (his Aunt). We would also like to thank the Supplier Payment Services for the beautiful flowers. Your thoughtfulness will always be in our hearts.

Josie Soliz and Richard Orozco

Retirees

The following JPL employees retired in April: Walter Walker, 42 years, Section 351; William Schreiner, 40 years; William Kloezezan, 37 years, Section 349; Fred Soltis, 35 years, Section 386; Jordan Ellis, 33 years, Section 312; Robert E. Brown, 28 years, Section 351; William Cunningham, 26 years; Joe Solario, 25 years, Section 513; Linsey Ray, 18 years, Section 366.

Classifieds

For Sale

ART GLASS: crackle glass decanters, vases, and pitchers, various colors, sizes and prices; 2+ foot tall red stretch vase (non-crackle), view at <http://www.cathouse-fcc.org/sale.html>, \$30. 626/794-9470 or bigcatlovr@aol.com.
BURNING MAN TICKETS (2), \$350 for the pair. 909/622-2129.
CAMERAS / ACCESSORIES: T, 35 mm, Konica Auto Reflex, w/Hexanon AR 57mm F1.4 lens, Hexanon 200mm F3.5 and 28mm F3.5; Vivitar model 283 electr. flash w/battery pack recharg., \$250; movie camera, Beaulieu MCR 8, regular 8mm with Angenieux Zoom lens F 6.5 - 52 mm, \$75; folding camera, Kodak "Vigilant", 620 film, collectors item, \$25. 352-3588.
CARD SHUFFLER, Johnson, collectible, all-metal construction w/the exception of friction whls that drive the cards + carved-wood dowel handles; stands ~6" handle-high, and ~9" by 6", flanges & handle inclusive, \$35. PORT REPLICATOR, for IBM Thinkpad, works w/T20, T21, A20, A21, or X, R series, like new, \$85; DIET TAPES, Jenny Craig, set of 14, \$50. 790-3899.
CAT FURNITURE, carpeted, good cond., <\$25. 626/731-2922, scuddy717@yahoo.com.
CHAIR, overstuffed, beautiful, near-new large retro-style + ottoman, very solid & comfortable, heavy fabric w/scotch-guard, see pix on jpl.ads, perfect cond., \$450/obo. 353-6369.
CHAIR for office, black, leather executive, great cond., like new, \$45; VACUUM CLEANER, Dirt Devil upright w/all attachments on body, new, \$40. 661/297-0219.
CHAIRS, 2 casual, carved, whitewashed, black tapestry (recently reupolstered), excellent cond., \$300/obo. 249-0573, Vickie.
CLOTHING: Jones of New York 2 pc./jacket & slacks, (jacket fully lined and slash pockets), new with tags, size 12, dark olive, \$100/obo; Rena Rowan for Saville, 2 pc./jacket & slacks, white, lined, size 14; never worn; pockets still stitched: \$50/obo. 626/398-4960.
COFFEE MAKER, Braun, 10-cups, white/black, like new, \$30 obo. 626/791-6101.
COMPOSTER, Rubbermaid,\$40; JEWELRY, amethyst & diamond ring, set in 14K gold, sz. ~5-1/2; 8mm pearl ring, set in 14K gold, sz. ~6; ART, R.C. Gorman signed print: EXERCISE EQUIPMENT, "beautiful" for arms and legs, isometric exercises, \$10, w/instr'ct'nal VHS, \$15; MASSAGER, Dr. Scholl's "Back Belt," new in box, grt. for home/office, \$10. 626/398-4960.
COMPUTER, Compaq Pentium 400 MHz, new 56K modem, w/monitor, \$295. 951-0000, Nik.
COMPUTER DESK & CHAIR, spacious, w/4 drawers, lt. beige veneer, comfortable, rolling "executive" chair has black leather upholstery, both in vg cond., great for home office, \$125

for desk, \$150 for chair, or \$250 for both. 626/792-2431, weekday eves. only 6 to 8 p.m.
DESK, antique, from Eastern shore Maryland called a "countinghouse," cherry, long drawer in base w/turned legs and fitted interior, Ca 1835-40, brass H/W 1878, \$5,000/obo. 249-0453, betw. 5-9 or jkbonner@gte.net.
DINING ROOM SET, antique oak, late 1800s, gate leg table w/2 pull-out leaves, 6 arrow-back chairs, buffet w/beveled glass mirror, exc. cond., \$1,200/obo. 353-6369.
DINING RM. SET, beautiful Mediterranean, 8 chairs, expandable from 6 to 12 person, 2 extra leaves + china cabinet, \$1,400. 667-5569.
DINING RM. TABLE, antique, w/end extensions + 4 upholstered oak chairs, mission style, \$325; DRESSER, antique walnut, 5 drawer, \$100; 26" TV, Sylvania console color, \$40. 626/359-7666.
DIN. RM. TABLE, large, rosewood, classical Oriental style, w/8 chairs; ARMOIRE, decorative shelves, bookshelf, entertainment unit; MISC: washer, dryer, frig. stove, microwave. 626/840-4983, Chau.
DODGER TICKETS, selected gms. from season ticket pkg., loge level (orange), aisle 132 (inside 1st base), 2 tickets/gm., face value of \$29/ticket. www.delunac.net/tickets, 626/296-1253.
DVD PLAYER, progressive scan, Toshiba SD-3750, like new, features: 3:2 digital cinema progressive conversion, enhanced audio mode/dialogue expander, 540-line output, 4x digital picture zoom, CD/DVD text display for titled discs, plays audio CD, CD-R, CD-RW, DVD, video CD, cheapest price on web is \$199.95, sacrifice for \$100; ORGAN, Yamaha 415 electronic w/13 pedals, 3 keyboards, 144 rhythm patterns, \$2,000. 790-3899.
DVD PLAYER, Phillips, \$60; MOUSE, USB, \$10; DISK DRIVE, internal Zip for Mac Powerbook G3 series, \$50; SURFBOARD, Rusty 7'1", \$80; GOLF CLUB, Calloway Big Bertha driver, \$40. 626/844-9228.
FIGURINE, Lenox porcelain, bride & groom "wedding cake topper", 7", never used, orig. box, wonderful wedding gift, \$50. 249-4316.
FITNESS EQUIPMENT, Elliptical Trainer (low-impact exercise machine) by ProForm, 485 E model 927, like new, bought new 2 yrs. ago from Sears for \$360, rarely used, sell \$150/obo. 626/284 4694.
FITNESS EQUIPMENT, Soloflex home gym, complete w/attachments, leg extension, butterfly attachment, dip bar, free-weight adaptable, w/box of resistance/weight straps, \$500. 323/268-7802, eves.
FURNISHINGS: recliner, comfy, teal, \$49; book-case, blue metal, glass doors, 4' w x 3' t, \$89; washer, Maytag, heavy-duty, lg. capacity, \$139; water dispenser, hot & cold, no bottles needed, \$29; desk chair, brown vinyl w/arms, \$12; bassinet, Trend Traveler, hangs above playpen (not incl.), navy in bag, \$10; stroller, pink & gray or white/blue/pink, \$15/ea.; freezer, European upright, needs work, \$19. 626/798-4510.
FURNITURE: 2 indoor/outdoor tables, custom-designed rod iron, glass top, \$1,500; computer desk, \$100; office chair \$35/obo. 248-1102.
HARP, Triplet Axline 30-string professional, full Loveland levers, fleece-lined carrying case, deluxe tuning key, exc. cond., \$2,400. 626/351-9150.
MARBLE piece, 1"x18"x30", black with a white vein traversing it, \$50/obo. 249-0453, betw. 5-9 or jkbonner@gte.net.
MISC.: A/C, Kenmore, fits sliding window, only 14" W x 22" T, \$149; vacuum tubes, approx. 300, many still in boxes, no numbers quoted, must take all, \$149; donut spare tire/wheel, TI05 80D-13, used once, \$39; massage machine, fits in chair, \$29; golf ball retriever, telescoping aluminum 12", \$10; wireless doorbell/intercom, \$39; kids rolling duffel bag, multicolor, never used, \$15; luggage set, Pierre Cardin, 3-piece, \$19. 626/798-4510.
MOUNTAIN BIKE, Trek 8000, vg cond., \$400/obo. 626/291-2740.
MOVING SALE: dresser, 4 drawer, blond wood, 37" W x 43" T x 16.5" D, \$49; dresser, 3 drawer, blond wood, computer desk w/keyboard drawer, 43" W x 30" T x 22" D, \$59; microwave, white, 1.3kw, very clean, \$49; free delivery to curbside in Pasadena area. vona@ai.mit.edu or 626/796-0610.
ORGAN, Wurlitzer, w/bench, two 44-key manuals, 1 octave bass pedal, electronic beats, mahogany, \$150. 248-9418.
POTTERY TEA SET, by Maine artisan, nautical theme, matching lighthouse design on all pieces, incl. tea pot, creamer, sugar, platter, small serving bowl, 2 mugs, 2 Japanese tea cups, never used, \$100 for set. 249-4316.
READING GAME, The Phonics Game, fun & interactive for children, like new, mostly unop-

ened, new \$395, sell \$200. 626/301-0723.
STEREO SPEAKERS, JBL LX 600, great cond., 3-way, 28" x 12" x 16", each is 36 lbs., great sounding / looking, rarely used with a tuner, originally \$680, sell \$200/obo. 626/284-4694.
STOVE, gas, Magic Chef, slide in, almond, electronic controller, gd. cond., 10 yrs. old, \$25. 626/794-2431.
TABLE TOP, butcher block hardwood, 60 x 28 x 1", with legs, \$75. 248-9418.
TREES, red banana plant, 5' tall, \$60/obo; fish tail, 6' tall, \$80/obo; ficus, >10' tall, braided, in 30" plastic pot, \$250/obo; CERAMIC BOWL, gray, 2' diameter with planted geraniums, \$40/obo. 626/791-6101.
TV, 19" color, w/remote, only 2 yrs. old, \$95/obo; ANTENNA, \$10. 626/282-5815.

Vehicles / Accessories

BOAT, 14-foot aluminum, w/trailer, 15-HP Johnson motor. 626/797-3838.
'91 CHEVROLET Cavalier convertible, 3.1L V6, automatic transmission, 103,000 mi., new top, gd cond., \$2,500/obo. 626/795-5345.
'01 FORD Focus, 4 dr., 22,000 mi., black, am/fm/cassette, a/c, factory alarm, qualify for loan & just take over payments, exc. cond., not looking to make anything off car. 626/831-4791.
'98 FORD Crown Victoria LX, 4.6L V8, 4 door, white/beige, leather, CD, keyless entry (remote and keypad), cruise, pwr. everything, 100K, split front seats, good cond., \$12,500. 822-6465, Ryan or code3media@crownvic.net.
'93 FORD Explorer XL, blue w/gray int., 2WD, 4-door, A/C, AT, PS, Pwr. drs/wnd, tilt wheel, cruise, am/fm/cass., ABS, privacy glass, roof rack, towing package, 200K mi., extremely well maintained, reliable SUV, very clean, see to appreciate, \$3,795/obo. 661/799-0725.
'01 HONDA Accord EX, 34.5K mi., gold, ABS, moonroof, 6-CD changer, remote entry, exc. cond., \$15,500/obo. 626/339-1210.
'95 HONDA Accord EX, 4 door, 92,000 mi. VTEC, a/c, moon roof, full power, good cond., \$7,000. 353-2103.
'95 HONDA Prelude, blue/grn, automatic, sunroof, spoiler, after-market CD player and alarm, runs great, 110K miles, \$6,600. 236-3683.
'95 JEEP Grand Cherokee Ltd., 132,000 mi., sunroof, leather, CD, a/c, pwr. everything, V8, detailed, exc. cond., \$7,000/obo. 626/584-6911.
'88 JEEP Cherokee Chief, red, 4 wheel drive, clean interior and body, 30,000 miles on eng., transmission and transfer case, \$3,500. 626/359-7666.
'85 KOUNTRY Lite 5th wheel trailer, 30 ft., orig. owner, alum. frame, 13.5K btu a/c, side bath, microwave, new tires & water pump, sleeps 6, exc. cond., kitchen equip. included, \$5,800/obo. 626/963-5727.
'96 LAND ROVER Discovery 5D, runs great, pwr. everything, recent tuneup, new hoses/belts, smog OK, dark green/tan leather, grill guard, 4x4, ready for family vacation or off-road fun, 92,800 mi., \$10,875/obo. 501-8161.
'93 MAZDA Miata, vg cond., 1 owner, many extras, low mileage, \$4,500. 626/351-9150.

Lost & Found

FOUND: Prescription glasses, in 601-157D conference rm. Ext. 4-9550, Barbara.

Free

COMPUTERS, for charitable cause (or otherwise, for small donation), working 486, some w/CD reader and sound card. 626/794-9579.

For Rent

ALTADENA guest house, 1 bd., fenced yd., secure, clean, quiet, above E. lot, walk to JPL, laundry, must like dogs, \$525 + 1/3 util., \$600 security deposit, avail. 5/1. 626/794-6076.
GLENDALE, 2 bd., 2 ba., condo, beautiful view, prime area, pool and access to tennis court, 5 min. from JPL, \$1,600. 667-5569 .
LA CANADA, private rm. in home, with private ba., off-street parking, BBQ, pool, full kitchen priv., wash/dry, etc., \$550+util. 790-1280.
LA CRESCENTA, spacious house above Foothill Blvd., 3 bd., 2 ba., lg. living room w/fireplace, formal dining rm., lg. kitchen w/den, huge fenced yard w/patio, \$1,950. 957-8332.
NE PASADENA, share rental in 3 bd., 1 1/2 ba. home on lovely, safe st.; full house privileges; fireplace, newer kitchen, laundry, patio, garage; no smoking/pets; 10 min. to Caltech, 15 min.

to JPL; to be shared w/single working female owner; \$470 incl. util. 626/398-5686, eves.
PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright kitch., prof. landscape, ctrl. air & heat, close to shop., cozy LR w/FP, end unit, frml DR, hdwd. flrs., immac. cond., close to schls. \$1,750. 626/396-9024.
PASADENA condo, newly remodeled, 2 bd., 2 ba., in beautiful Madison Heights area, upgraded kitch. w/new appliances, hardwd floor, priv. patio, 2-car gated gar., washer/dryer hookup, walking dist./Caltech, \$1,870. 626/233-9496.
PASADENA, lg. condo in centr. located complex, 2 bd +office, 2 ba., fully furn., ideal for visiting staff, 2 parking spaces, 1 mile/Caltech, JPL owner, flexible lease, avail. May 1, \$2,000/neg. 202/544-8142, dmt00@earthlink.net.
PASADENA townhome-style apt. to share, fully furn. 3 bd., 3 ba., w/patio, a/c, laundry facil., close to Caltech and JPL, \$625 incl. util. 626/351-9641.
SIERRA MADRE, townhouse-style apt. to share, 1,000 sq. ft., lg. patio, 2 bd., 1.5 ba., quiet st., garage parking, washer/dryer in unit, \$605 + 1/2 utils. 626/355-4838, Heather.
SOUTH PASADENA, historic 2 bd., 1 ba. bungalow, hdwd floors, fireplace, built-in buffet in din. room, upgraded kit. & lndry rm., \$1,600. 626/441-0338, eves.

Wanted

FLOUR MILL, table-top. 626/355-4793.
HOME FOR DOG, female shepard mix, 1.5 years old, great, fun, playful, needs an active loving home. 370-4680.
SPACE INFORMATION/memorabilia from U.S. & other countries, past & present, for personal use. 790-8523, Marc Rayman.
TAP SHOES, women's sz. 7 or 7 1/2, black. 909/944-1959.
VOLLEYBALL PLAYERS, coed, no beginners please, Tuesday nights 8-10:00 at Eagle Rock High School, \$3/nt. 956-1744, Barbara.

Real Estate

MT. WASHINGTON house, next to Glendale/Pas./Eagle Rock/Occidental College, 2,000 sq. ft., lg. custom 3 bd., 2.5 ba., 2-car gar., lots of storage, exc. elem. school, 12 min./JPL, cyn. view, quiet neighborh'd, avail. summer '03, ask for JPL discount, virtual tour at <http://www.circlepix.com/site/tour/index.htm?searchtourid=63-39461>, \$479,000. 626/403-0446.
VICTORVILLE, land near former George Air Force Base, 1/2 acre, \$20,000. 626/850-4378.

Vacation Rentals

BALBOA ISLAND, cute beach apt., fully furn. 2 bd., 1 ba., patio, washer/dryer, parking, slps 5, steps to bay, avail. weekly thru the summer, \$1,000-\$1,500/week depending on week. 626/351-9641.
BIG BEAR LAKEFRONT, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548.
CAMBRIA, ocean front house, sleeps up to 4, exc. view. 248-1102.
HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps 4, laundry fac., Low Season rate \$105/nite/2, High Season rate \$120/nite/2, \$15/nite/add'l person. 949/348-8047, or jackmandrandy@cox.net.
MAMMOTH, Snowcreek, 2 bd., 2 ba., +loft, slps 6-8, fully equipped kitchen incl. microwv., D/W, cable TV, VCR, phone, balcony w/mtn. vw. Jacz., sauna, streams, fishponds, close to Mammoth Creek. JPL discount. 626/798-9222, 626/794-0455 or valerie@gps.caltech.edu.
OCEANSIDE, on the sand, charming 1 bd. condo, panoramic view, walk to pier & harbor, pool/spa, game rm., sleeps 4. 949/786-6548.
OCEANSIDE condo, fully furn., 2 bd., 2 ba., fireplace, full kitch., quiet, relaxing, beautiful beachside setting, w/BBQ/pool/spa/game rm./grt. ocean vw., easy walk to pier & restaurants, slps 8, avail. weekly or monthly. 909/981-7492 or dfhauge@yahoo.com, Darlene.
ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.
SANTA CRUZ, fully furn. house near beach & harbor, 2 bd., 2 ba., large deck, modern kitch., washer/dryer, walk to restaurants, slps 4, \$900/wk. wns111@pacbell.net or 831/464-5031.